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BIOMORPHIC SYSTEMS & MISSIONS: SURFACE-AERIAL COOPERATIVE
EXPLORATION STRATEGIES

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Biomorphic systems and cooperative missions based there-on make synergistic use of existing/ conventional surface and aerial assets such as landers and orbiters along with novel biomorphic explorers that imbibe nature tested capabilities to enable new scientific endeavors. Just as in nature, biological systems offer a proof of concept of symbiotic co-existence, the intent here is to capture/imbibe some of the key principles/success strategies demonstrated by nature and capture them in our biomorphic mission implementations. Specific science objectives targeted for these missions include close-up imaging for identifying hazards and slopes and assessing sample return potential of target geological sites, deployment of surface payloads such as instruments/surface systems or surface experiments, and atmospheric information gathering by distributed multiple site measurements. Candidate examples of both atmospheric and imaging payloads along with imaging strategies to obtain stereo images with high spatial resolution will be discussed. Communication options to successfully down link the data will also be discussed. Specifically, the mission concept of lander launched/deployed microflyers will be described in detail because of its near term applicability as an auxiliary payload within future scouting mission to Mars.

Another biomorphic mission concept to be described is of applicability to Earth science within its solid earth & natural hazards research theme leading to applications in disaster management and human health & safety for example on volcanic areas.

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